5.1 GENERAL

This Chapter presents information on the tentatively Recommended Plan. This includes descriptions of the major project features associated with construction of the project, real estate requirements, and operation and maintenance requirements. Information is also presented on project construction and maintenance costs, benefits of the project, and an economic analysis.

5.2 PLAN DESCRIPTION

In general, Alternative 2B includes the following: (1) removal of approximately 72% of the earthen dam structure; (2) backfilling the spillway with dam material for stabilization; (3) removal of approximately 95% of the accumulated sediment from behind the dam; (4) construction and restoration of York Creek from just below the dam to just above the sediment basin with a slope of approximately 5%; (5) restoration of roughly 3 acres of aquatic and riparian habitat with native vegetation and; (6) use of native plants for erosion control and site stabilization.

5.2.1 ACCUMULATED SEDIMENT REMOVAL, DISPOSAL, AND REUSE

As seen below in Table 5.1, the volume of material that would be removed has been separated into 3 reaches: Reach 1 is the material accumulated downstream of the dam; Reach 2 is the dam material; and Reach 3 is the reservoir sediment located behind the dam.

Table 5.1. Recommended Plan: Quantity of Dam and Sediment Removal

Estimated Dam and Sediment Removal Quantity in cubic yards	
Reach 1: Downstream Sediment	830
Reach 2: Dam Material	11,777
Reach 3: Reservoir Sediment	26,637
Total	39,244

Heavy earthmoving equipment would be used to remove the accumulated sediments. As seen in table 5.1, the estimated amount of accumulated sediment to be removed from behind the dam is 26,637 cubic yards.

Before the sediment material is hauled off for reuse or disposal, the material would be sorted, and materials necessary for restoration would be stockpiled. It is estimated that approximately 400 cubic yards of dam material is needed to recontour the channel. The sediment that is not reused onsite would need to be taken to a an offsite location.

5.2.1.1 Disposal and Reuse

There is an opportunity to beneficially reuse the project sediment and dam material at various locations. These opportunities include potential reuse at the City's lower reservoir. Other opportunities include reuse at private vineyards or for the City's flood control project at Fulton Lane. All beneficial reuse locations would be considered in the design and implementation phase.

For feasibility level analysis, two primary disposal sites were identified for the project's estimated 38,900 cubic yards or material. The first would utilize beneficial reuse and the second, a permitted landfill, would act as a backup, or guaranteed location for disposal.

Specifically, The first site is beneficial reuse at the City's Lower Reservoir. The second location is Clover Flat, a permitted landfill that is located within 9 miles of the project site. It is expected that 75% or the total project material (29,180 cubic yards) will be taken to the Lower Reservoir and 25% (9,730 cubic yards) will be taken to Clover Flat. Please note that these disposal options will be further analyzed during the Plans and Specifications Please see section 5.3.1 Dam and Sediment Disposal Location for information regarding the uncertainty relating to disposal options.

The Lower Reservoir is located approximately 1 mile downstream from the project site. Instead of disposal, the City is considering making its Lower Reservoir available for off-site reuse and storage of the project sediment. To accomplish this, the water surface elevation would be lowered, and fine sediments would be place on the exposed bank and graded to a stable configuration for long-term storage. It is estimated that storage of the fine sediments would require approximately 6-12 acre-feet, 3.5-7% of the reservoir's capacity.

The Lower Reservoir is considered a water of the U.S. and there is wetland vegetation on the edges of the lower reservoir. Appropriate permits and approvals will need to be acquired for utilization of the Lower Reservoir. There is currently agency support for this use.

Clover Flat is a permitted landfull that is located within 9 miles of the project site in the City of Calistoga. Project trucks would drive 2 miles from the upper reservoir along Spring Mountain Road and Madrona and then 6.5 miles to the Clover Flat landfill via Highway 29, Deer Park Road, and Silverado Trail.

5.2.2 DAM REMOVAL, DISPOSAL, AND REUSE

Heavy earthmoving equipment would be used to remove the dam material. As seen in Table 5.1, the estimated amount of dam material to be removed is 11,777 cubic yards.

5.2.2.1 Disposal and Reuse

The spillway would be filled and buried by using on-site materials from the dam structure to reduce the volume of dam material. Approximately 11,777 cubic yards of earthen dam sediment would need to be removed from the project site and would be taken to the Lower Reservoir for eventual reuse by the City or to Clover Flats for disposal. Please see section 5.2.1.1 Accumulated Sediment Disposal for more detailed information.

Due to the presence of naturally occurring asbestos, there are restrictions placed on how the dam material can be used and disposed of. For the dam material, this means that there are limitations on how the material can be reused. Specifically, the dam material cannot be used for surfacing applications. To the extent possible, the dam material will be first used to fill the spillway and this material will be covered with acceptable surfacing material. For more information, please refer to section 5.4.8 HTW Considerations

5.2.3 YORK CREEK CHANNEL RESTORATION

The constructed channel would be approximately 23 feet wide and 5 feet deep. The proposed trapezoidal channel has either a 1.5H:1V (horizontal:vertical) or 2H:1V side slopes and would be designed to maintain a low-erosion flow velocity with approximately a 5.09% slope

Two specific channel restoration designs have been developed from these dimensions and parameters mentioned above:

- The first channel design (Channel Design 1) would be designed to include all features of a functioning creek. The design will include channel cross-sections, plan form, pools and riffles, channel slope and bottom material.

- The second channel design (Channel Design 2) would be limited to a basic cross-section, plan, slope, and bottom material. Pool and riffles would be allowed to form naturally over time within this cross-section. The basic cross-section will be similar to the riffle detail on Plate 7 of Appendix A: Hydrology and Hydraulics.

Currently, the project designs include Channel Design One. Specifically, this currently includes the design of pools, riffles, and runs in the channel. Currently, there are 4 pools, 5 riffles, and 1 run included in initial design. The riffles are designed to be approximately 64 feet long, the pools 105 feet long, and the run to be between 69 and 92 feet long. These features are preliminary. Pool and riffle lengths for this design have been designed to be longer than the existing representative reaches in York Creek as the high sediment load above the project area is expected to move downstream, creating its own equilibrium. Pools and riffles are expected to shorten until an equilibrium state is reached.

The actual channel design will be determined in the design phase. If Channel Design Two were selected, it would provide the recommended restoration cross-sections, plan and slope requirements while allowing for the natural formation of pools, riffles, and bars over time. There is an adequate supply of gravel to the restoration area. A simple cross-section set on the original channel combined with a reasonable meander plan should provide a good base for future channel evolution. It is likely that this method would be more cost effective and therefore will be further considered during the Plans and Specifications Phase.

Earthmoving equipment would be used for construction activities. Construction activities for Channel Design 2 would include recontouring the stream banks, placing rock for bed and bank stabilization, and placing boulders and trees for fish habitat structures. Channel restoration includes design features of pools, riffles, and runs in the channel design. Specifically, there are 4 pools, 5 riffles, and 1 run included in initial design. The riffles are designed to be approximately 64 feet long, the pools 105 feet long, and the run to be between 69 and 92 feet long. These features are preliminary. Pool and riffle lengths for this design are purposely longer than representative reaches in York Creek. There is adequate existing sediment in the upper watershed that is expected to move downstream and into the project area. This sediment load would allow the engineered creek to adapt to its own equilibrium over time. Pools and riffles are expected to shorten until an equilibrium state is reached. This allows for the most natural stream design and avoids over engineering the streambed.

5.2.3.1 Erosion Protection

Alternative 2A/2B includes a partial removal of the Upper York Creek Dam (also called the Notched Dam Alternative). The remaining dam embankment will be stabilized so that it would continue to support Spring Mountain Road. As part of maintaining slope stability the lower slope of the dam would be protected against erosion with vegetated riprap. Vegetation alone would not protect the embankment against calculated channel velocities of 13 ft/sec. If the toe is allowed to erode the geotechnical design safety factors would change and the road above could be subject to sliding.

The riprap design for this project is based on the DFG California Salmonid Stream Habitat Restoration Manuel, part Vii, Project Implementation, Boulder Riprap. The riprap would be placed on a 1V:1.5H slope. The height of the riprap above the proposed design channel bottom was determined by first calculating the 100-year water surface elevation. The design riprap elevation would be set 4.5 feet above the proposed channel invert.

Riprap sizing was determined using the HEC-RAS hydraulic computer model and in reference to riprap size requirements as outlined in EM 1110-2-1601 1 July 1991. Based on the above, the necessary rock size would be 42 inches. Existing site conditions indicate that the selected riprap size is reasonable. The sediment that is moving through the project area is in the 12 to 20 inch range. A lesser number of large boulders 30 inches across and greater are in the project areas.

Additional riprap would be required at the toe of the riprap slope to support the slope and to protect against scour. A toe trench as shown in Figure 5.1 would be constructed 3 feet below the planned channel bottom. Place riprap would be placed with soil and willow stakes. The riprap would be covered with vegetation. The filter behind the riprap would be constructed of geotechnical fabric reinforced with geogrid matting. The filter layer can also be constructed of rock and gravel if appropriate for vegetation, geotechnical stability and economical.

Below, Figure 5.1 shows a cross-section of the riprap design. For more information, please refer to the Hydrology and Hydraulics Appendix.

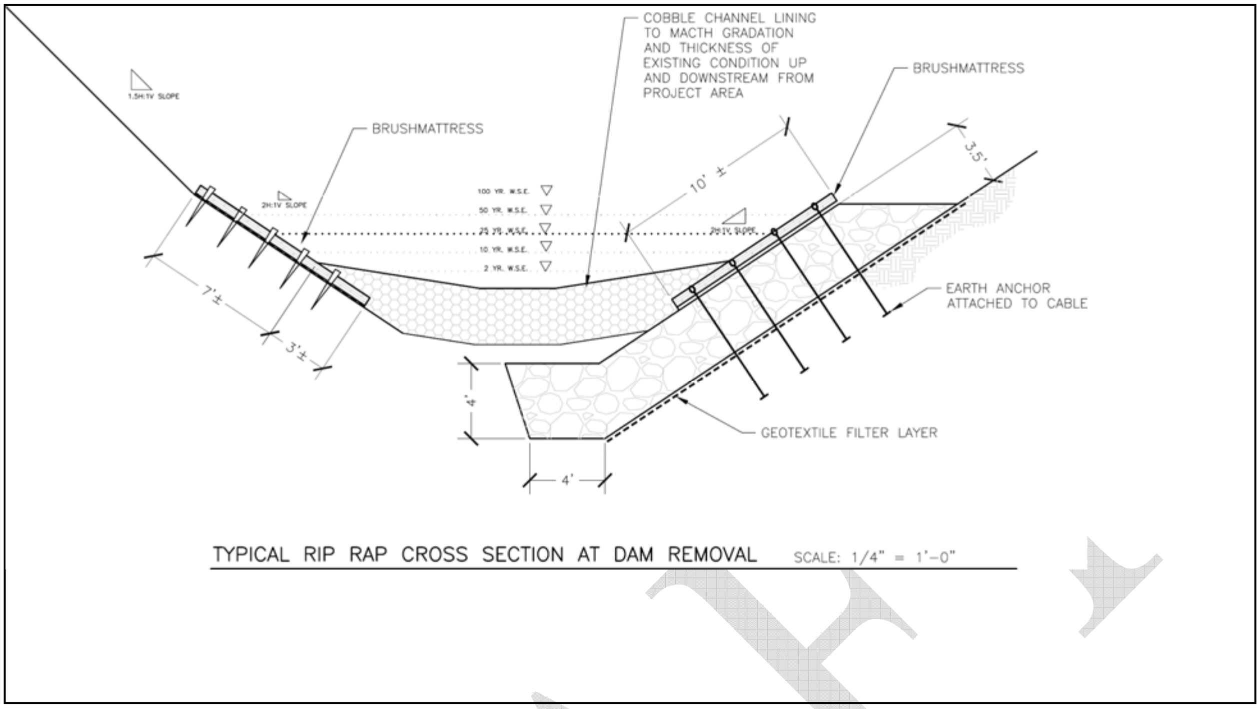

Figure 5.1 Riprap Design

5.2.3.2 Grade Control

Current design alternatives have not included plans for significant grade control. However grade control may be necessary for the following reason. During construction of the dam the York Creek's natural gravel streambed may have been removed to prevent seepage under the dam. Also there may have been disturbance to the creek upstream of the dam during construction. Current alternative designs have assumed that the original channel bed material wood still be in place and be available for the restored design. This may not be true therefore channel restoration may require grade control for the final restored channel bed. Grade control should be planned for however the required extent and locations will not be known until construction is under way and the proposed projects creek bed is exposed.

5.2.4 REVEGETATION

The project would require revegetation of roughly 2 acres of disturbed area for the recommended alternative. Revegetation would focus on creation of self-sustaining native vegetative habitat, control of erosion and stabilization of the newly created stream channel. For specific details, please refer to Appendix G: Habitat Revegetation Report.

Revegetation of the areas disturbed by construction would follow three vegetation types: Bank Zone, Terrace Zone, and Riparian Zone. These zones were based preliminary on hydraulic modeling to establish the elevations of the zones relative to the channel bed. These zones would be refined on the basis of further iterations of the detailed design of the selected project.

Specifically, revegetation would include 0.4 acres of Bank Zone, 0.5 acres of Terrace Zone, and 1.1 acres of Riparian Zone. This totals 2.0 acres of restored habitat acreage. The Bank Zone would be planted with emergent aquatic vegetation 0.5 to 3 feet above low flow water surface elevations. There would be 2 to 5 rows of plants, spaced 1 foot apart. Plants such as rush, sedge, wildrye, deergrass, willow and alder would be used. The Terrace Zone would be planted with woody plants placed 3 to 5 feet above the low flow water surface. Plants such as wildrye, deergrass, maple, elder, dogwood, buckeyes, oak and fir, amongst others, would be used. The Riparian Zone would be planted with tree and shrubs placed approximately 5 feet above low flow water surface elevation. Plants such as dogwood, redwood, firs, snowberry, oaks, rose and buckeyes, amongst others, would be used.

5.2.4.1 Revegetation Construction Phasing and Coordination

Revegetation activities would need to be coordinated with dam removal, slope stabilization structures, bank stabilization as well as erosion protection. Revegetation of surfaces exposed by removal of sediment in some areas could proceed prior to dam removal or other major construction to minimize erosion.

5.2.4.2 Revegetation Steps

As the areas exposed by sediment removal and channel-grading operations would likely not have a significant weed seed bank, it is important that revegetation efforts proceed as soon as possible after earthwork, thereby taking advantage of the relatively weed free starting condition and filling the vacuum with desirable native plants rather than exotic weedy species. If a phased approach to revegetation is taken, it is important that desirable erosion control grasses and forbes are seeded first to help crowd out weeds. Plants can be installed over one or two years, however higher costs would be associated with a two year installation.

5.2.4.3 Irrigation

Temporary irrigation during the planting installation and the following four-year maintenance period would be provided. The goal of the irrigation is to increase plant survival rates, growth rates and encourage deep plant rooting. This requires frequent watering in the first season, followed by increasingly infrequent and deep watering in the second, third and fourth years. Irrigation in most locations would be by drip. Irrigation tubing and pipe would be removed from the site at the end of the establishment period. Overhead spray irrigation systems would be used for areas with high density plug plantings. Plantings in the bank zone would be irrigated for two years. Plantings in the terrace zone would be irrigated for 3 years. Upland zone plantings would be irrigated for 4 years.

Irrigation water source may be provided by the contractor from a well developed on site. The well should be located above the 100-year floodplain. At the end of the maintenance period the well should be abandoned per local regulations

5.2.4.4 Establishment/Maintenance

An establishment and maintenance program would be a critical component of a successful revegetation program. The maintenance period for establishing the plants would be for 2-4 growing seasons after installation depending on zone. Zones closest to the stream require shorter maintenance due to decreased depth to groundwater in dry seasons. Maintenance items would include: weed control, irrigating plants, planting upkeep, and some minor re-planting efforts. Monitoring and reporting of the project would be required for each year along with three yearly reports.

5.2.4.5 Weed Control

During the establishment phase, a regular weed control program shall be implemented including the appropriate use of herbicides, mechanical, and hand weed control methods. The area immediately around each planting location (within 36-48") would be kept free from weeds by herbicide application and by hand weeding. This is especially important in the first and second years of establishment and increasingly less important in the third and fourth years. Weeds outside the immediate vicinity of the plant locations would be controlled by mowing and by timed nonselective, pre-emergent and/or selective broadleaf herbicide applications in the first and second growing seasons. Application may be by broadcast or by spot depending on extent of weed infestation.

5.2.4.6 Operations, Monitoring and Maintenance of Vegetation

A simplified monitoring program shall be developed and implemented during the construction period. All hand planted species in the irrigation rows should be monitored, as well as the grasslands to determine restoration establishment success. The monitoring program shall be developed and carried out by experienced biologists, and at a minimum consist of the following: (1) plant survival counts in spring and fall (by species and area). (2) photographs (Permanent color photograph stations); (3) yearly reports.

5.2.5 SLOPE STABILITY

The actual size of the notch would be based on further geotechnical analysis that would be done during the Design and Implementation Phase for construction. Slope stability and new stability measures to be put in place must be based on further analysis and field exploration during the Design and Implementation Phase. Currently, it is anticipated that 2 rows of 11 reinforcing screw anchor nails (geotechnical slope stability tools) will be placed through the dam site. These will be installed 50 to 100 feet into the ground based on their starting position. The actual number of rows of anchors will be determined upon completion of the final investigation and design.

5.3 RISK AND UNCERTAINTY

There are three primary areas of uncertainty and/or risk for this project. They include: (1) the disposal location for the dam material and accumulated sediment; (2) project site slope stability; and (3) post project natural sediment transport to downstream areas and the potential for induced flooding. To every extent possible during the feasibility phase, the PDT has evaluated these areas of risk and uncertainty. Below is a description of the areas of risk and uncertainty, assumptions that have been made regarding these areas, and the status of resolution. In every case, further evaluation is recommended in the Design and Implementation Phase.

5.3.1 DISPOSAL AND REUSE LOCATION

As of May 2006, the City and the Corps' PDT made the decision to move forward with plans to utilize the Lower Reservoir with the understanding that the City would further their investigations to determine if this was a feasible option for construction initiating in 2007. There are many reasons for using the Lower Reservoir. These reasons include the following: (1) it is located only 5,000 feet from the project site; (2) it is owned and operated by the City; and (3) the City could stockpile this material at the Lower Reservoir for eventual reuse.

However, a later preliminary grading plan showed that the Lower Reservoir could not accept all of the project material. In response to this comment, the Corps PDT further investigated disposal options at Clover Flat, a permitted landfill that is located within 9 miles of the project site, for a portion of the dam material and accumulated sediment. Currently, it is expected that 75% or the total project material (29,180 cubic yards) will be taken to the Lower Reservoir and 25% (9,730 cubic yards) will be taken to Clover Flat. These disposal options, as well as other opportunities, will be further evaluated in the Design and Implementation phase. Ultimately, the disposal decision will be the choice of the construction contractor.

5.3.2 SLOPE STABILITY CONCERNS

Maintaining the stability of the adjoining Spring Mountain Road is considered as a project constraint that must be addressed adequately to achieve project success. To the extent possible in feasibility studies, slope stability concerns have been incorporated into the design of the recommended alternative and the Corps' PDT works closely with the City's geotechnical engineer to ensure that both parties are satisfied with the design and monitoring plans.

Additionally, a monitoring program should be implemented to quantify actual ground movement and stability at the project site. The primary objective of this program would be to obtain information that would allow us to evaluate the magnitude of deformations that may develop during and after removal of a portion of the dam. The monitoring period would be for a 6-month duration, which is typical for end-of-construction condition. Please see the Geotechnical Engineering appendix for more information.

5.3.3 SEDIMENT TRANSPORT AND DOWNSTREAM FLOOD IMPACTS

All watersheds yield sediment (clay, silt, sand, gravel, cobble, etc.) and sediment deposition on alluvial fans (valley bottoms) is a natural process. The gradient of the stream above the City is relatively steep and the stream has relatively high capacity to move sediment in the downstream direction. The reach through the Valley is less steep and has less capacity to move sediment in the downstream direction. It is possible that more natural deposition patterns could increase flooding potentials in the downstream areas of York Creek by reducing capacity of lower York Creek to convey flood flows.

The recommended alternative would modify the dam that currently blocks natural sediment transport to downstream reaches of York Creek and allow for natural sediment transport thought the project site. Under proposed project conditions, sediment that is now trapped behind the dam each year, would be transported downstream to the Napa Valley reach of York Creek. The majority of the sediment will be transported to the Napa River.

According to the Corps' July 2006 Lower York Creek Existing Conditions Assessment and Dam Removal Impacts assessment, a significant percentage of the sediment could be deposited on the bottom of York Creek in the Napa Valley Reach (USACE, 2006). It is possible that creek capacities in this area would be reduced as sediment that was once deposited behind York Creek Dam, falls out in these flatter areas and the creek channel reaches a new equilibrium. During high rainfall years, an estimated 2,000 cubic yards of sediment could be deposited in York Creek from its confluence with the Napa River in a location lone mile upstream (USACE, 2006). If a bottom width of 10 feet is assumed, sediment deposition of one foot could be deposited throughout the lower one mile of York Creek. One foot of sediment could raise the water surface elevations during maximum capacity events by and estimated .5 feet (USACE. 2006).

The Assessment offered several preliminary treatments for future consideration. These include: (1) trim riparian vegetation to reduce channel roughness; (2) remove instream obstructions; (3) construct a 1-3 foot tall levee of floodwall in low capacity areas; (4) widen the channel in low capacity areas; (5) regrade and/or contour so sheet flows are channeled back towards the creek in an area of higher capacity (USACE, 2006).

The reduction in channel capacity is currently not expected to increase flood duration or flood depth when compared to the existing condition. A more thorough analysis of floodplain depths and flood duration for existing conditions and project conditions will be completed for final design. Modifications to project design and operations and maintenance will be made to minimize any impact. If further analysis shows that downstream property is negatively impacted by the project, a Corps' Real Estate Takings Analysis would be necessary and will be completed.

As the project non-Federal sponsor, the City understands the project's risks and uncertainties and has committed to establishing a baseline condition for sediment transport and hydrological conditions for York Creek downstream of the project site. The City assumed the responsibility for this need and is working with to evaluate pre-project baseline conditions, which will then be used during the design phase to predict potential changes in the channel morphology because of the project's implementation. The City will develop a monitoring plan to track deposition, aggradation, and induced flooding from the project and will actively manage post-project conditions to maintain flood control downstream of the project area.

5.4 CONSTRUCTION CONSIDERATIONS

5.4.1 SITE PREPARATION

Two existing access roads to the Upper York Creek Dam bed from public road are still barely visible. Both roads require improvements before it can accommodate heavy equipment traffic for this project. One of the access roads is a simple gravel path while the other, from the top of the dam, is in better shape. The major work around the dam bed area would be carried out by either earth moving equipments or the hauling trucks.

5.4.2 CONSTRUCTION WINDOW

Construction activities in the project area would occur from June to October during daylight hours, beginning after 8 AM and ending before sunset each day. Night work would not be allowed. Sediment hauling on Spring Mountain Road would be completed by October 15th coinciding with the end of the construction window for streams supporting salmonids.

5.4.3 EQUIPMENT FOR CONSTRUCTION

Equipment for construction would generally be the choice of the contractor. Guidelines for equipment based on best management practices would be further considered during Design and Implementation Phase. The equipment mentioned in this section has been developed for feasibility level cost estimation.

5.4.4 PROJECT SITE DEWATERING

Dewatering of the sediment basin is necessary to provide dry land for construction work, such as sediment removal, channel contouring and dam removal. The type of cofferdam shall be selected by the contractor. Guidelines for dewatering based on best management practices would be further considered during Design and Implementation Phase. The methods mentioned in this section have been developed for feasibility level cost estimation.

There are several ways to accomplish dewatering and the appropriate solution depends on the stream water flow rate, site topographic condition, and designed operational objective. Given the magnitude of work to be performed in the Upper York Creek project area, complete isolation of the water from the creek bed appears to be necessary for construction. One solution is the use of a cofferdam. The construction of a cofferdam would prevent water from entering the sediment basin work area. A cofferdam is an impermeable structure constructed with material such as rock, sandbags, wood, sheet metal, and/or gravel. Cofferdams can also be constructed by different methods or materials, such as Fas-Dam which is available commercially. A cofferdam at this project site in combination with a bypass channel or a piping mechanism would divert water flow around the sediment basin and would likely be passed through the spillway to below the dam.

5.4.5 PRESERVATION OF EXISTING VEGETATION

Existing native vegetation to be preserved shall be surrounded by protective fencing near construction areas requiring vehicular access or access by mechanized construction equipment. Existing sensitive State or Federally listed threatened or endangered plant species and adjacent existing native plant communities located within the project limits or adjacent to access routes shall be surrounded during construction by protective fencing.

5.4.6 EROSION CONTROL

Permanent erosion control vegetation in habitat areas would consist of native vegetation. Erosion control for disturbance from construction activities outside habitat areas would consist of exotic and/or native grasses best suited for the particular areas needing protection. The following information is described in detail in Appendix G: Habitat Revegetation Report.

5.4.6.1 Storm Water Runoff Erosion

A Storm Water Prevention Plan (SWPPP) would be provided with the Design and Implementation phase that specifies minimum acceptable erosion and sedimentation Best Management Practices (BMP's). The SWPPP also outlines the procedures for complying with National Pollution Discharge Elimination System (NPDES) pollution prevention requirements and permitting. NPDES laws require all construction projects over one acre in size to comply with local NPDES permitting requirements. In California, this means that erosion and sediment control BMP's must be in place during the rainy season.

5.4.6.2 Erosion Control Best Management Practices

Erosion controls BMP's would consist of seeding permanent native vegetative cover in all areas. Areas disturbed by construction with steeper topography that generate sheet flow would receive appropriate erosion control BMP's, such straw mulch, bonded fiber matrix hydromulch, and erosion control fabric etc. in addition to the vegetative cover. Areas disturbed by construction with topography that concentrates flow or conveys concentrated off site run-on would receive erosion BMP's, such straw mulch, bonded fiber matrix hydromulch, cobble dissipaters and erosion control fabric etc., in addition to the vegetative cover.

Sedimentation control BMP's would consist of straw rolls, silt fences and/or sedimentation ponds, which would be implemented where necessary to prevent discharge of sediment-laden runoff into receiving waters.

5.4.6.3 Rainwater Erosion on Engineered Embankments

Where rock is not present, erosion from rainfall runoff would need to be controlled by establishing erosion control grasses on these surfaces. During the time that grasses establish in the first season after seeding, temporary erosion control would be provided by straw mulch with tackifier. A sufficient overburden of soil would need to be designed into the embankments to allow ripping and cultivation of soil of the compacted surfaces to allow grasses to thrive. Native and non-native species may be used, as the highly compacted soils limit species choice. These harsh conditions require use of grasses adapted to drier conditions and poorer soil than the immediately surrounding area.

5.4.6.4 Erosion Control Grass Seeding

Grass mixes would be applied by hydroseeding or broadcast seeding. Hydroseeding shall be by a two step process, where seed fertilizer and a minimal amount of hydromulch is applied. This is followed by a second heavier application of hydromulch. Two step hydroseeding processes ensure better contact of the seed with soil and offer more protection of the seed from drying. Hydromulch should be made of wood fiber, not recycled paper as the recycled paper type of mulch forms a crust which inhibits grass growth and water penetration. Tackifier should be an organic, non ashpaltic type, derived from plantago plants. Native grass mixes would be applied with mycorhizal inoculum applied at the same time the seed is applied.

5.4.7 TRAFFIC IMPACTS FROM CONSTRUCTION

Most of the truck traffic, would result from hauling sediment, moving boulders to the project site for construction, and hauling gravel and cobble material for construction.

For disposal, it is expected that 3 dump trucks will be adequate for disposal at the Lower Reservoir and 6 trucks for disposal at Clover Flat. Each truck can carry 12.5 cubic yards of materiel. Trucks disposing at the Lower Reservoir will be capable of hauling 600 cubic yards per day with 48 daily trips. Similarly, trucks disposing at Clover Flats will be capable of hauling 600 cubic yards per day with 48 daily trips.

Assuming that 75 % of the truckloads will be taken to the Lower Reservoir and 25% of the loads will be taken to Clover Flat, there will be a minimum of 66 days of disposal truck traffic. It will require approximately 3,114 truck trips and will result in approximately 17,910 total miles of road use. More specifically, Clover Flat disposal will result in approximately 13, 240 miles of road use and disposal at the Lower Reservoir will result in approximately 4670 miles of road use.

This traffic is expected to put pressure on the normally narrow and bucolic Spring Mountain. Hauling traffic through St. Helena and on Spring Mountain Road has the potential to cause temporary impacts to traffic along the hauling route. Trucks turning in and out of the project site may also cause traffic hazards. Traffic control would be required as would haul time restrictions (or a hauling window) to allow local residents and businesses reasonable and safe access to roads.

The following measures would reduce project-related traffic impacts:

- The contractor shall prepare a traffic control plan and provide a copy for Caltrans review and approval. The plan shall identify the following: staging areas; dump sites; operating hours; project duration; scheduling; phasing; the total number and type of construction vehicles; and respective vehicle haul routes per project phase.

- A minimum of 2 flaggers would be necessary. Beginning in mid-September, hauling traffic will be subject to potential delays and re-routing as wine production traffic increases during harvest and crush
- Hauling along State Routes 29 and 128 shall be limited to off-peak hours (between 9:00 AM and 3:00 PM) to the extent possible.
- The contractor would be required to provide standard Caltrans traffic controls for trucks entering and leaving the roadway.
- To minimize wear on roads, dump trucks would be filled such that their maximum weight is 10% less than the legal limit of 60,000 pounds on Spring Mountain Road.
- The City and County would evaluate degradation of road conditions by surveying and documenting road conditions before and after project implementation.

5.4.8 HTW CONSIDERATIONS

Innovative Technical Solutions, Inc. (ITSI) conducted an Hazard and Toxic Waste assessment (HTW) at the project site. The following recommendations have been developed as a result of the HTW assessment:

- No areas requiring remediation before construction were identified.
- Concentrations of asbestos were much higher in the dam samples (serpentintinite-rich) than in samples of sediments (poor in serpentinite). The presence of asbestos in samples of the earthen dam and sediment bed at York Creek would necessitate the adoption of specific BMPs. Generally, BMPs would include the following
    a. The maintenance of adequately wetted conditions to prevent the release of asbestos fibers into the air; run-off and mud control; upwind, downwind, and personal exposure air monitoring
    b. Asbestos-specific training for site workers. Different operational requirements apply, depending on whether sites are less than or greater than one acre in size, and whether site operations are construction or grading versus quarrying or surface mining. However, because the ACM is naturally occurring, a California-licensed asbestos contractor <u>would not</u> be required to excavate the site.
- Re-use of materials from the earthen dam for surfacing applications, e.g., roads, parking lots, near-surface filling (less than six inches deep), or use in concrete or mortar, is prohibited, based on reported asbestos detections of greater than 0.25 percent.
- Based on low asbestos concentrations in samples of the sediment bed, the sediments may possibly be suitable for re-use in surfacing applications. However, additional sampling and analysis would be required to fully characterize materials for surfacing applications, per California regulations. Assuming a weight of 12,000 tons for the sediment bed, additional analyses of four three-way composite samples would be required.

5.5 REAL ESTATE REQUIREMENTS

5.5.1 TOTAL LANDS REQUIRED

The total lands required for the project are 3.04 acres in fee title, 1.55 acres for road easements, and 3.44 acres for temporary work area easements. All lands are provided by the non-Federal sponsor.

5.5.1.1 Dam/Spillway-Restoration Site

The property for the dam/spillway-restoration site is a single parcel of 27.35 acres. The dam and spillway are located at the easterly end of this long and narrow parcel. This land lies within the creek channel in the immediate vicinity of the dam and spillway.

5.5.1.2 Lower Reservoir and Project Staging Area Site

Portions of two parcels that adjoin the St. Helena Lower Reservoir will be used for construction staging and long-term storage for sediment that is removed from the restoration area and for road access from Spring Mountain Road to the storage area. A 200,000-gallon water storage tank is located on the southwestern portion of the property. The balance of these lands is undeveloped as they serve as a buffer area for the reservoir.

Table 5.2. Land Value

Feature	Estate	Acreage	Owner	Land Value
Dam Removal	Fee	3.04 acres	City of St. Helena	$54,720
Temporary Road Access	Temporary Road Access Easement	1.55 acres	City of St. Helena	$10,850
Construction Staging Area	Temporary Work Area Easement	3.44 acres	City of St. Helena	$57,792

5.5.2 BASELINE COST ESTIMATE

A gross appraisal was prepared for this property at the October 2005 price levels. The land cost estimates are based on this report. All lands, regardless of ownership, have been estimated at fair market value. There is no difference between State and Federal rules in the valuation of the lands to be acquired.

Table 5.3. Baseline Real Estate Cost Estimate

Non-Federal	Federal	LERRDS	Total

NA[1]	$93,500	$167,000	$260,500

5.5..3 TAKING ANALYSIS

A Taking Analysis is presently being considered and will be prepared for the final report. However, considering the current and anticipated flooding (frequency, depth, and duration) there are no anticipated "takings" being considered at this time.

5.6 MONITORING AND ADAPTIVE MANAGEMENT

Project monitoring would be necessary to understand and accommodate for known and unknown risks and uncertainties and to ensure project success. Project monitoring would occur prior to initiation of construction, during construction, and after completed construction.

During the Design and Implementation phase, criteria would be determined to evaluate the levels of risk and uncertainty. For any area that could require adaptive management during construction, the expected criteria would be defined for the contractor. These criteria would be the responsibility of the contractor to meet. Beyond the construction period, all monitoring and adaptive management would be the responsibility of the Non-Federal Sponsor.

Likely areas of monitoring and adaptive management would include the following:

- Track the geophysical evolution of the project and assess the impact to the downstream environments (Ground surveys);
- Assess water transport and sediment transport in York Creek (Ground surveys, hydraulic modeling, stream gaging with sediment sampling or turbidity measurements)
- Gauge changes to slope stability;
- Monitor and evaluate the physical evolution and wildlife use of restored habitats. (Biological surveys)

Specific detailed monitoring actions would be identified during design in the during the Design and Implementation phase.

5.6.1 PRE-CONSTRUCTION MONITORING

In order to establish the baseline conditions, a site-wide survey would be conducted before the start of construction. The site-wide survey would include biological monitoring such as fish, avian, invertebrate and vegetation surveys as well as topographic surveys and hydraulic modeling. All further monitoring information collected during the project life would be

[1] Because the non-Federal sponsor has owned the property for more than 5 years, they are prohibited from receiving credit for administrative costs associated with their requirement to provide the lands.

compared to the baseline data as part of the decision-making process. The results of the monitoring period determine if impacts are positive or negative. Perceived negative impacts to wildlife, vegetation, or flood capacity in comparison to the baseline would be addressed by specific adaptive management actions.

5.6.2 GEOTECHNICAL SLOPE STABILITY MONITORING

As mentioned previously, maintaining the stability of the adjoining Spring Mountain Road is considered as a project constraint that must be addressed adequately to achieve project success. On this basis, a monitoring program should be implemented to quantify actual ground movement and stability at the site. The primary objective of the monitoring program is to obtain information that would allow us to evaluate the magnitude of deformations that may develop during and after removal of portion of the dam. The monitoring period would be for a 6-month duration, which is typical for end-of-construction condition.

5.6.3 ADAPTIVE MANAGEMENT

Adaptive management is a means to alleviate uncertainties that may be associated with restoration design or specifications. For the Upper York Creek project, the adaptive management plan would provide for distinct actions that may be taken given the performance of the project at any given time during construction. Adaptive management would be incorporated into the construction contract based on criteria established during Design and Implementation Phase. Any changes to construction would be the responsibility of the construction contractor. For CAP projects, the Corps is not authorized to share in the costs of adaptive management once construction is completed; these costs would be the responsibility of the non-Federal sponsor.

5.6.4 PERIOD OF MONITORING AND ADAPTIVE MANAGEMENT

The Corps involvement in monitoring would be limited to no more that five years after completion of physical construction. The costs of monitoring shall be included in total project costs and shared with the non-Federal sponsor. These costs can not exceed one percent of the cost of the features that are to be monitored minus the cost of monitoring, unless a waiver is obtained.

Continued monitoring after the five-year period would be the responsibility of the non-Federal sponsor. As a component of their OMRR&R duties, the non-Federal sponsor would assume sole (i.e., non cost-shared) responsibility for operation and maintenance of the project beyond the five year monitoring and adaptive management period. Routine inspection and maintenance of the project post-construction would not be considered part of monitoring and adaptive management and would be considered part of OMRR&R.

5.7 OPERATIONS, MAINTENANCE, REPAIR, REHABILITATION, AND REPLACEMENT CONSIDERATIONS (OMRR&R)

Upon completion of construction of the recommend plan, and concurrent with the monitoring and adaptive management period, routine operation and maintenance would commence. Routine operation and maintenance would include sediment removal operations, channel maintenance, inspections, repairs, maintaining vegetation and removal of invasive exotic vegetation, where feasible. The costs associated with OMRR&R would be the responsibility of the non-Federal sponsor.

5.8 PROJECT BENEFITS

Below, Table 5.3 summarizes the upstream ecosystem restoration benefits for the project alternatives.

Table 5.4. Ecosystem Restoration Benefits for Recommended Plan

Upstream Ecosystem Benefit Units		
Potential Steelhead Carrying Capacity	**Percentage Effectiveness for Steelhead Passage**	**Total Ecosystem Benefits**
1800	100%	1800

5.9 ECONOMIC SUMMARY

The cost estimate for the recommended plan is presented Table 5.3.

Table 5.5. Recommended Plan Economic Outputs (FY 2006 Price Levels)

Cost Items	Recommended Alternative
Benefits	
Ecosystem Benefits	1810
LERRDs	
Land Acquisition	$167,000
Federal Administration Cost (non credit)	$93,500
LERRDs Subtotal	$260,500
Plans and Implementation Phase	
Geotech	$80,000
Water Resources	$100,000
Environmental Compliance	$50,000
Other	$20,000
P&I Phase Subtotal	**$250,000**
Construction Phase	
Construction	$4,884,599
Engineering During Construction	$150,000
Supervision & Administration	$350,000
Cultural Resources	$30,000
Construction Phase Subtotal	*$5,925,099*
Monitoring & Adaptive Management	$208,266
TOTAL FIRST COST	$6,133,365
Total Costs	
TOTAL FIRST COST	$6,133,365
Interest during construction	$384,659
TOTAL GROSS INVESTMENT	$6,518,024
Total Cost of Maintenance (OMRR&R)	$1,037,258
TOTAL COST	$7,555,282
Annual Costs	
Annual Costs of Total Gross Investment	$435,205
Annual Cost of Maintenance (OMRR&R)	$20,745
Total Annual Costs (AAC)	$455,950
Average Annual Cost per Ecosystem Benefit	**$240**

5.9.1 MONITORING AND ADAPTIVE MANAGEMENT COSTS

The Federal participation in monitoring would be limited to a five-year period after construction, and adaptive management should be accomplished within that period. At this time the specifics of the monitoring and adaptive management plan have not been defined, therefore a limit of two percent (2%) and three percent (3%) for each item, respectively, is included based on current policy on maximum Federal interest.

Construction and post-construction monitoring and adaptive management would be cost-shared 65/35 with the non-Federal sponsor. If an adaptive management construction need is identified during the adaptive management period, the activity would be cost shared regardless of the appropriation situation and regardless of when it is constructed; the non-Federal sponsor would expect reimbursement for building these features without Federal funds if appropriations do not keep up with funding needs. If the need is identified after the adaptive management period, then the non-Federal sponsor would be responsible for the costs.

5.10 NATIONAL SIGNIFICANCE

Environmental restoration is a priority in the Corps of Engineers budgeting process for the Civil Works water resource development program. In contrast to more tradition project outputs, many of the outputs of environmental restoration projects cannot be measured in monetary terms. Without the option of quantifying environmental outputs in monetary terms, other criteria must be considered for evaluating and justifying environmental restoration projects. One such criteria is the "significance" of the environmental resource(s) associated with such projects. For this purpose, resource significance can be described in terms of Institutional, Public, and Technical significance.

5.10.1 INSTITUTIONAL SIGNIFICANCE

Institutional Significance means that the importance of an environmental resource is acknowledged in the laws, adopted plans, and other policy statements of public agencies, tribes, or private groups.

Upper York Creek Dam has been identified as a significant obstacle to passage for the federally listed, threatened, CCC steelhead. York Creek has also been designated as critical habitat for threatened CCC steelhead by the National Marine Fisheries Service. The removal or breeching of Upper York Creek Dam would open approximately 2 miles of suitable upstream habitat for steelhead.

The following public agencies are supportive of the Upper York Ecosystem Restoration project and have provided input during the planning process: California Department of Fish and Game (DFG); California Regional Water Quality Control Board (RWQCB); City of St. Helena (City); Department of Water Resources (DWR); Napa County Resource Conservation District (NCRCD); National Marine Fisheries Service (NMFS), and the United States Fish and Wildlife Service (USFWS).

5.10.2 TECHNICAL SIGNIFICANCE INSTITUTIONAL

Technical significance means that the importance of an environmental resources is based on the scientific or technical knowledge or judgment of critical resource characteristics. Below is a discussion of technical significance for Upper York Creek.

In California, steelhead were once abundant in coastal and Central Valley Rivers and streams. A rough estimate of the total statewide steelhead population is 250,000 adults. This is less than half the population of 30 years ago. The major factor causing steelhead population decline is freshwater habitat loss and degradation. This has resulted from three main factors: inadequate stream flows, blocked access to historic spawning and rearing areas due to dams, and human activities that discharge sediment and debris into waterways.

The Napa River basin is known to contain 27 species of freshwater fish, 14 of which are native and 13 are exotic species that have been intentionally or accidentally introduced (Stillwater Sciences, 2002; Moyle, 2002). Historically, the basin likely supported three salmonid species: chinook salmon, steelhead, and coho salmon; coho salmon are considered extirpated within the basin.

Historically, large runs of steelhead trout made their way up the Napa River to spawn in its tributaries. In terms of population size and geographic distribution, steelhead are the most significant salmonid species within the watershed. Napa River steelhead populations have been greatly reduced from historical levels. It is estimated that the Napa River watershed supported a population of approximately 8,000 adult steelhead as recently as 100 years ago. The current steelhead population is unknown due to a lack of quantitative data. Recent basin wide surveys estimate the population to be between 200 and 1,000 adult steelhead (Stillwater Sciences, 2002; EcoTrust, 2001). Despite reduced populations, the Napa River watershed is considered one of the most significant anadromous fish streams within San Francisco Bay (Leidy et al., 2005) (NCRCD, 2005).

Upper York Creek Dam has been identified by NMFS as a completely impassable barrier to approximately 2 miles of upstream migration and spawning habitat for steelhead. The channel of York Creek that is impacted under the current conditions is known to provide spawning and rearing habitat for CCC steelhead. The dam also blocks access for resident fish and other aquatic wildlife to suitable aquatic habitat above and below the dam.

A 2005 Salmonid Habitat Report by the NCRCD found that overall, York Creek is one of the most significant spawning and rearing streams for steelhead within the Napa Basin. Specifically, the upper reaches of York Creek offer excellent rearing and spawning habitat, and creating access to these areas would greatly benefit the overall steelhead population. Additionally, electrofishing efforts by Stillwater Sciences in 2005 and surveys by NMFS and DFG have determined that rainbow trout are also present above the Upper York Creek Dam and Reservoir. These populations could become anadromous if given the opportunity (NCRCD, 2006).

5.10.3 PUBLIC SIGNIFICANCE

Public Significance means that some segment of the general public recognizes the importance of an environmental resource. Below is a discussion of public significance for Upper York Creek.

Generally, the PDT has worked closely with the City and public agencies in an effort to ensure that the public's best interests were considered during the feasibility phase of this project. However, the general public has not been directly involved with this project and recent efforts have been taken to ensure public awareness during the public review and comment period that will be conducted for 30 days beginning in July 2006.

5.11 PROJECT JUSTIFICATION

The Recommended Plan is considered justified based on the significance of the non-monetary benefits as compared to average annual costs. The average annual cost per habitat unit is $240. The ecosystem benefits are considered significant as the approximately 2 miles of upstream aquatic habitat would provide spawning and rearing habitat for the federally listed steelhead *(Oncorhynchus mykiss*). Under the current conditions, York Creek is known to be one of most significant spawning and rearing streams for steelhead within the Napa River Watershed Basin for steelhead.